Russia’s stance in Paris accord implementation

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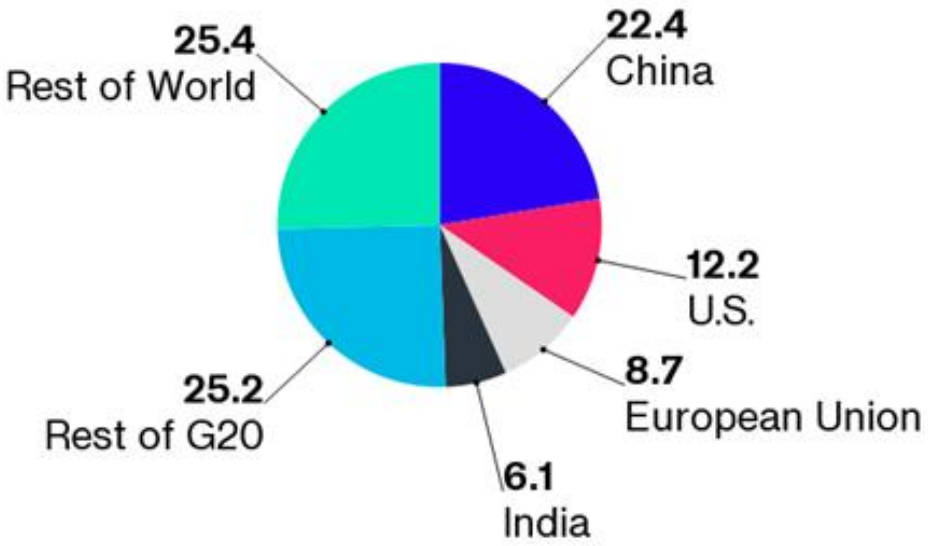
Kyoto protocol outcomes

- Russia pledged not to exceed 1990 GHG emission levels by 2012 so as developing countries did. Potential participation in ‘Joint Implementation’ mechanism.
- Russia’s joining Kyoto protocol and ratification enabled it’s complete validity since 2005. Participants cumulative emissions ought to exceed 55% of worldwide.
- No actual projects realized by 2012 due to inertia and barriers, no financial gains.
- Eurostat data: -18% reduction in GHG emissions reached by EU by 2012 compared to 1990 levels *(annual reduction rate -0.75%/yr).* -22% by 2016.

Russia – 4th in GHG emissions, 5.8%

Global Share of Greenhouse Gas Emissions (%)

G20 accounts for about three quarters of global emissions



Source: World Resources Institute's CAIT Climate Data Explorer

Data are for 2012 and include emissions from land-use change and forestry.

Bloomberg

Paris accord 2015

- India. A goal to cut the emissions per unit of economic output by 33 percent to 35 percent by 2030 from 2005 *(annual reduction rate -1.4%/yr).* The world's third-biggest emitter also aims to get 40 percent of its electricity capacity from non-fossil fuels by 2030.
- Japan. A 26 percent reduction in greenhouse gases in 2030 from 2013 levels *(annual reduction rate -1.5%/yr).* Renewables in 2030 will provide 22 percent to 24 percent of power in 2030, and nuclear will generate another 20 percent to 22 percent.

Paris accord 2015

- China. A pledge for its emissions to reach a peak “around” 2030, making “best efforts” to do so early.

Cut carbon dioxide emitted per dollar of economic output by 60 to 65 % from 2005 *(annual reduction rate -2.5%/yr)*

Increase the share of energy from renewables and nuclear power to 20 % by 2030.

- United States. The biggest historical emitter said it will cut emissions by 26 percent to 28 percent in 2025 from 2005 levels *(annual reduction rate -1.3 – 1.4%/yr).*
- European Union. The 28-nation bloc pledged a 40 % cut in greenhouse gases by 2030 from 1990 *(annual reduction rate -1%/yr).*

Paris accord 2015

- Brazil. An absolute reduction in emissions of 37 % in 2025 from 2005. The country has indicated “for reference purposes only” that the reduction would be 43 % by 2030 *(annual reduction rate -1.7 – 1.9%/yr).* The country also aims to eliminate illegal deforestation by 2030.
- Promised actions would limit warming this century to +2.7 degrees Celsius (IPCC, UN). That’s short of 2 degrees by 2100.
- Need for more ambitious upgrades in national action plans.

Russia's pledge in Paris accord

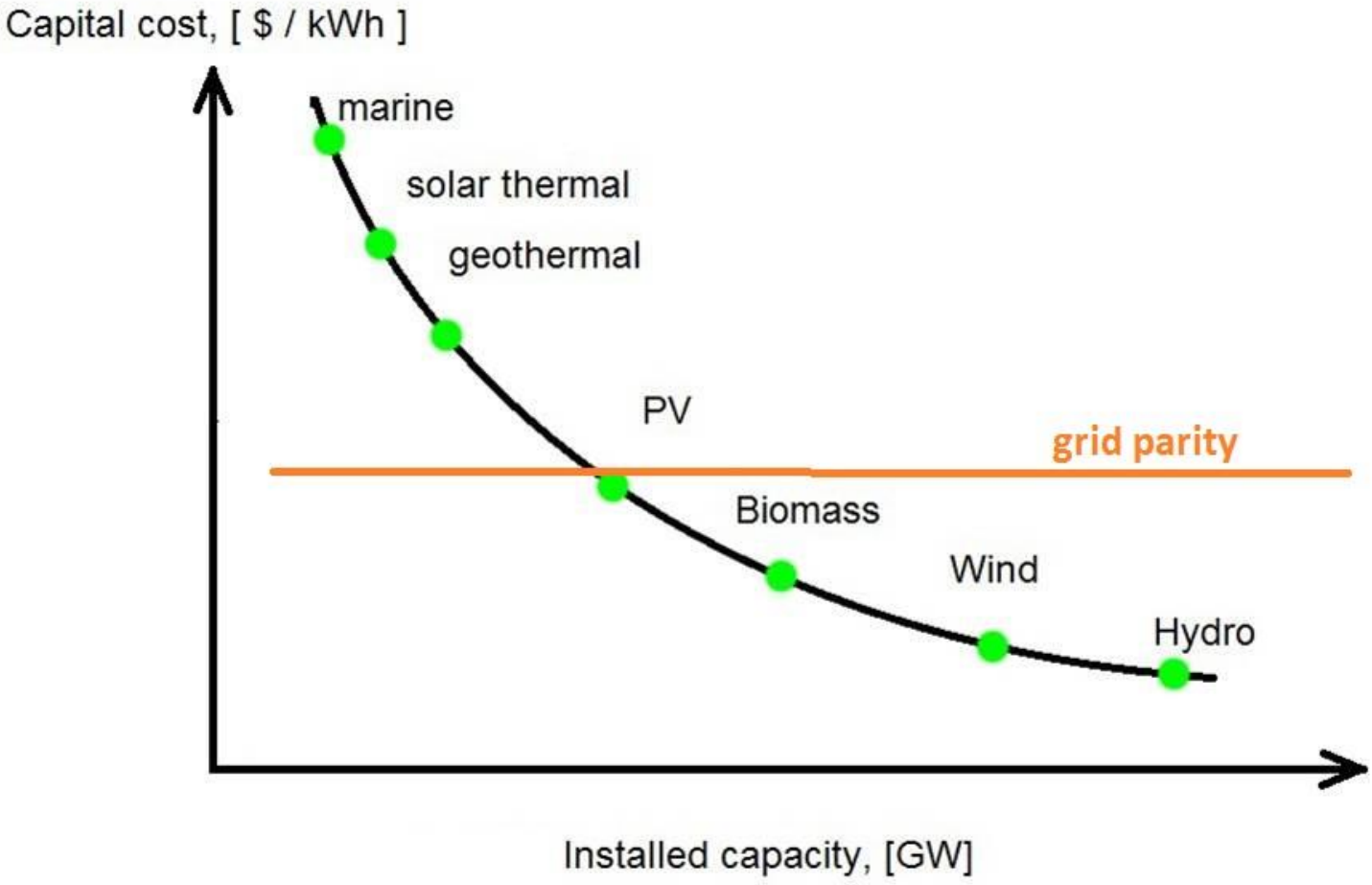
- Russia has overshoot it's Kyoto protocol targets: GHG emissions reduced by 31% in 1990-2012. Cumulative avoided emissions amount to 40 Gt CO2 equivalent > annual global GHG footprint.
- Reduction rate in Russia's energy intensity *-2.8%/yr* – 33.4% in 2000 – 2012. Further EI reduction by 13.5% in 2015 – 2020 *(annual rate -2.7%/yr)*
- By 2030 Russia plans to cut GHG emissions to 70% compared to 1990 levels (-30%). *Annual reduction rate -0.75%/yr* – among the least ambitious. No increase in 2015 – 2030.
- Russia's action plan is 80% based on energy efficiency improvements with additions from renewable capacity deployment (10%) and new investment in nuclear power (10%).

National RE targets in Russia

- First national target indicators for renewable energy were established in 2009.
- According to federal program “Energy Efficiency and Energy Sector Development” 6.2 GW of new generation capacity based on renewable sources should be installed in Russia by 2020

- Thus RE share in national energy balance could reach 2.5%, comparing to 0.8% at present
- Deployment of 6.2 GW renewable energy capacity corresponds to annual investment of $2 billion/yr
- Average figure for RE investment in Russia in 2005-2015 is estimated at $100 million/yr – that is 20 times less the announced level

Technology assessment tool: learning curve



Technological platforms in renewable energy by 2030

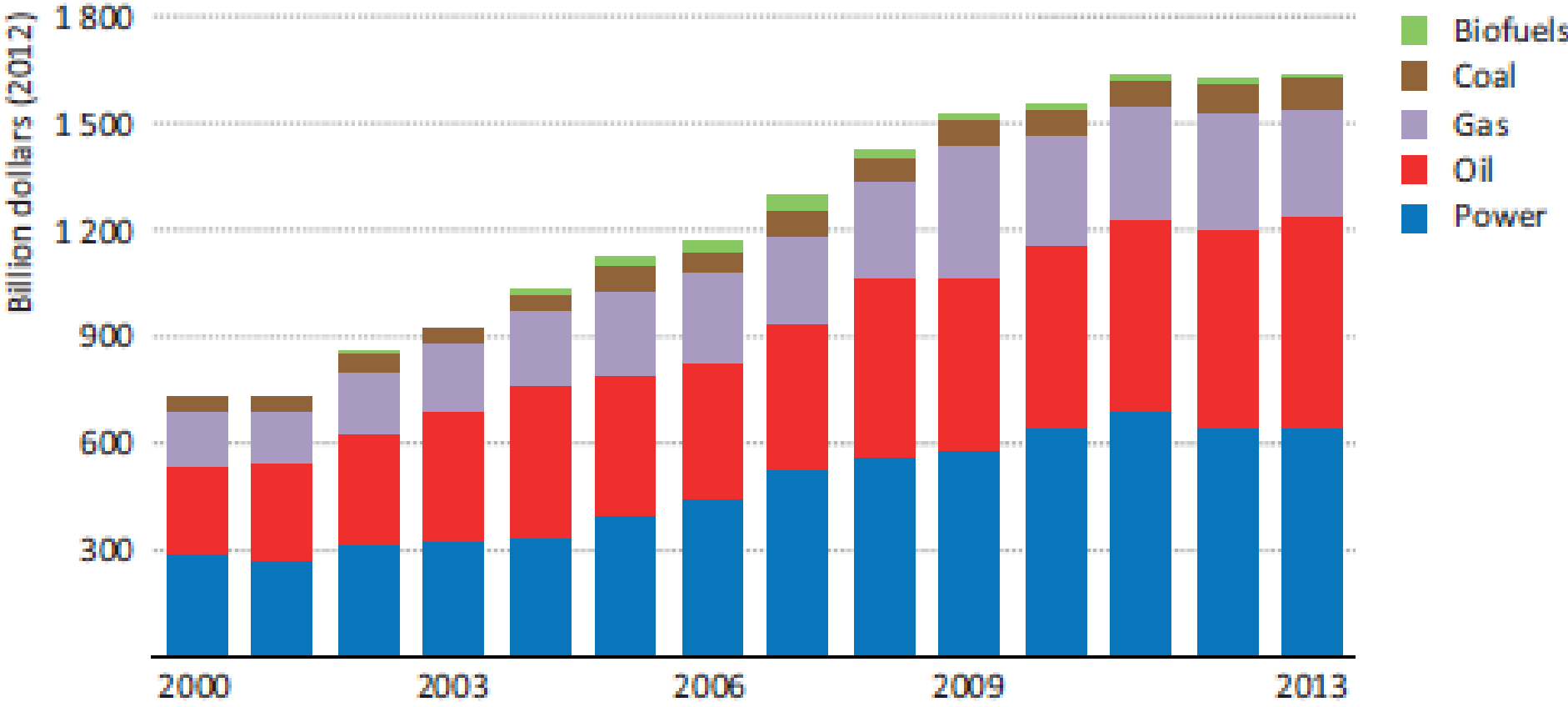
- 4 government-private partnerships are dealing with renewable energy:

1) ‘Bioenergy’,
2) ‘Perspective renewable energy technologies’,
3) ‘Small scale distributed energy systems’, and
4) ‘Ocean resources’.

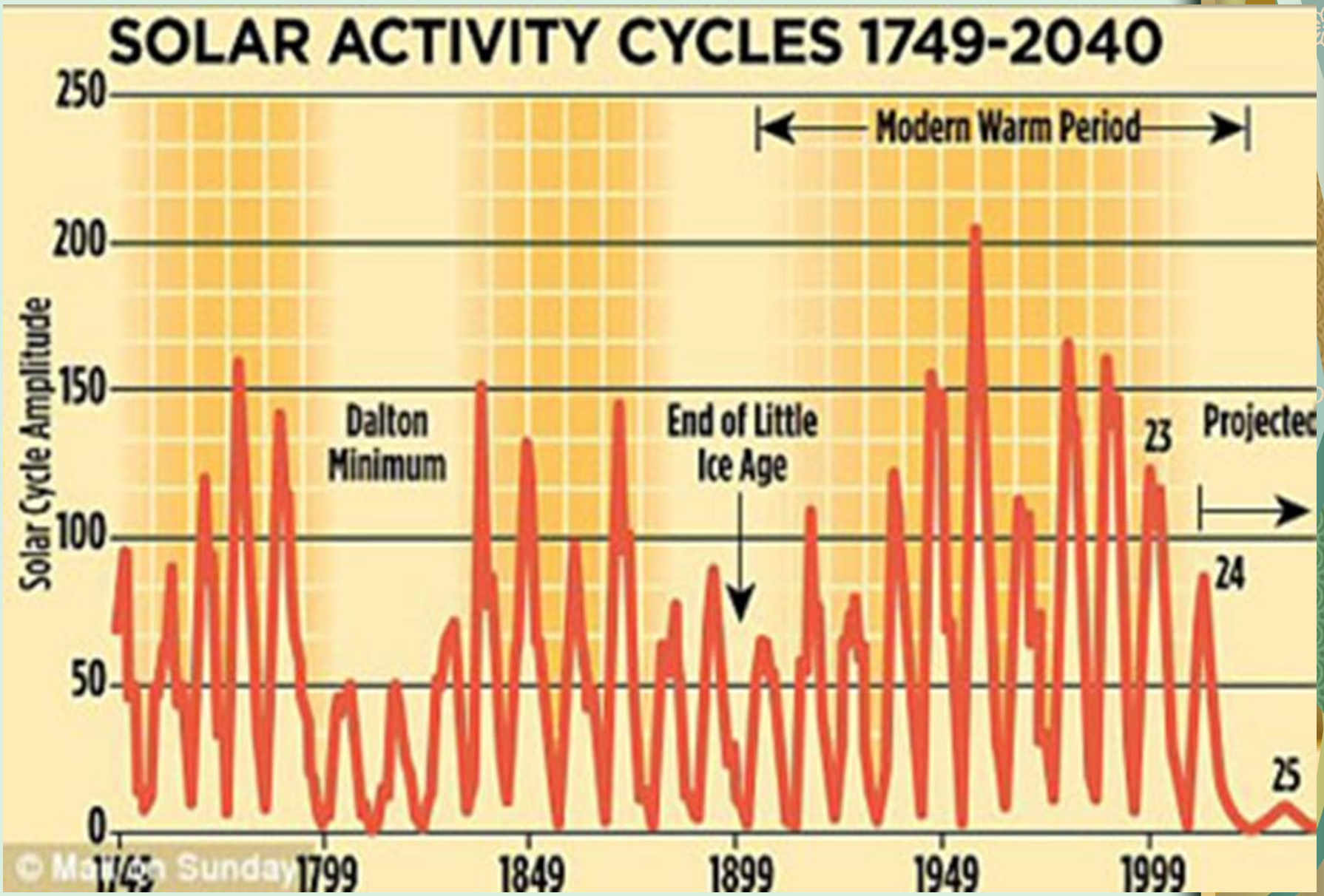
- Renewable energy (RE) is a real high technology sector with double-digit annual growth rates, attracting domestic and international investment, so it is a window of opportunity in potentially vast Russian market.
- The main issue here is whether the Russian technological platforms could match global trends in RE advance.

Source: IEA

Figure 1.1 ▷ Investment in global energy supply



Source: www.solarweather.com



Remarks

- Evaporation/precipitation +3% at +1^{o} C in temperature reached in 2015. H_2O vapor – the strongest GHGas.
- Energy content of hydrosphere going up. Number and level of extreme events going up.

- Russia 2015-30 flat trend in GHG emissions: economic growth to be offset by carbon intensity drop.
- Russia's nuclear share to rise from 16%, 2015 to 19 %, 2030 (3% fossil fuel generation could be substituted).
- New Russia's RE capacity could substitute another 3% of fossils.
- The rest 24% of GHG reduction (overall -30% by 2030) should be reached by energy efficiency (EE) measures.

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1.Research in micro algae bioenergy: search for isolates of micro algae promising lipid producers. Development of cultivating methods to get maximums for biomass and target products. Onshore- and offshore-based energy systems for large scale microalgae cultivating. Field studies – search and sampling of lipid containing algae. The following cultures of algae has been extracted from natural sources: Arthrospira, Dunaliella salina, Nannochloropsis sp., which are promising as the producers of lipids that is, in its turn, the base of biofuel.

2.Evaluations and mapping resources of solar and wind energy. Development of the GIS concept “Renewable energy sources of Russia”. Error analysis of NASA SSE data. NASA Surface meteorology and Solar Energy (NASA SSE) base –meteorological data based on the results of multiannual solar irradiation observations for the global network 1°×1°. 126 meteorological stations in the different regions of Russia. MSU observatory. Maps: - Resources of solar, wind, geothermal energy; - Resources of bioenergy; -Operating and designed RSE stations.

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3.Evaluation of gross and technical renewable energy potential in: small hydro-energy (<10MW), geothermal energy, low-potential earth energy, biomass energy, including agricultural waste, solid urban waste, sewage, forestry waste on the Russian Federation territory.

4.Technology and Economical assessment. New and renewable energy (NRE) technologies: we mainly use standard cost-benefit analysis approach. Research and development phase (R&D) requires special treatment, comparison with analogues is useful. In the deployment phase we look at: 1) capital expenditure, 2) operation and maintenance costs 3) overall energy costs at different locations. On the demand side we assess: a) potential applications for the new technology b) the size of the market niche. Special consideration: national energy pricing system. General conclusion should be derived on the competitiveness of particular energy technology. Comparison with traditional energy supply.